

REMARKS

Claims 1-18 were pending in this application, with Claim 1 being independent.

Applicants have cancelled herein without prejudice or disclaimer of that which was thereby Claims 2, 4, 5, 6, 10-14 and 17.

Applicants have amended Claims 1, 3, 7, 8, 9, 15, 16 and 18.

Applicants have added Claim 19-25, support for which is replete throughout the application. The newly added claims capture that which was set forth in the cancelled claims, though in the context of a solder joint. Applicants have recast the claims in this way since the Examiner was not giving patentable weight to what she considered product by process limitations in the now deleted claims. (See Action, page 2, first paragraph.)

Accordingly, upon entry hereof, Claims 1, 3, 7-9, 15-16, 18 and 19-25 will be pending and presented for examination.

Initially, Applicants note with thanks the indication in the Action at page 6 that the Examiner has reconsidered and withdrawn her previous claim rejections over Domi.

Claims 1-18 stand rejected under one or more of 35 U.S.C. §§ 112, 102 and 103. More specifically, Claims 4-6, 10,

11, and 13 are rejected under 35 U.S.C. § 112, second paragraph, as allegedly being indefinite; Claims 1 and 2 are rejected under 35 U.S.C. § 102(b) as allegedly being anticipated over Tulman (U.S. Patent No. 4,806,309); Claim 2 is rejected under 35 U.S.C. § 102(b) as allegedly being anticipated over Domi et al. (U.S. Patent No. 6,319,461); Claims 1, 2, 7 and 14 are rejected under 35 U.S.C. § 102(b) as allegedly being anticipated over Achari et al. (U.S. Patent No. 5,863,493); Claims 1-4, 6, 8-12, 16, and 18 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Achari; and Claim 5 is rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Achari in view of Steen et al. (International Patent Publication No. WO 00/048784).

Applicants turn to these rejections in turn below.

In view of the new rejections advanced in the Action, which are discussed in detail below, Applicants have amended Claims 1, 2, 3, 7-10, and 14-18. Many of these amendments either replace the transitional phrase "comprising" with -- consisting essentially of -- or change the Sb content to --1-3 wt. %--, and/or provide a ratio of a Sb:Ni of 1:1.5-3.

Before responding to the substance of the Action Applicants respond to the Examiner's comment on page 2 of the Action:

Regarding claims 2, 4-6, 10-14 and 16-18, the limitations are considered product by process limitations only and not to further limit the structure of the final product of the solder material because the composition of the end product does not depend on the method of production.

The Examiner's comment is misguided as the claim amendments introduced in Applicants' previous paper indeed define the compositional structure of the claimed composition. Nevertheless, the cancelled claims and claim amendments render moot this comment.

Section 112 Rejections

Claims 4-6, 10, 11, and 13 stand rejected to under 35 U.S.C. § 112, second paragraph, as allegedly being indefinite for the reasons given at pages 2-3 of the Action.

Applicants traverse the reasoning advanced to support the Section 112 rejections. Applicants' cancellation of Claims 4-6, 10, 11 and 13 nonetheless renders moot the Section 112 rejection of those claims.

Section 102 Rejections

Claims 1 and 2 stand rejected under 35 U.S.C. § 102(b) as allegedly being unpatentable over U.S. Patent No. 4,806,309 ("Tulman"), for the reasons given at page 3 of the Action.

Claim 2 stand rejected under 35 U.S.C. § 102(b) as allegedly being unpatentable over U.S. Patent No. 6,319,461 ("Domi"), for the reasons given at page 3 of the Action.

Claims 1, 2, 7 and 14 stand rejected under 35 U.S.C. § 102(b) as allegedly being unpatentable over U.S. Patent No. 5,863,493 ("Achari"), for the reasons given at page 3 of the Action.

Applicants' cancellation of Claims 2 and 14 renders moot the Section 102 rejections thereof. Applicants traverse the remaining Section 102 rejections.

The present invention as defined for instance by Claim 1 as amended is directed to a lead free soldering material consisting essentially of Sn (tin), 10 wt.% or less Ag (silver), Bi (bismuth), 1-3 wt.% Sb (antimony), 3 wt.% or less Cu (copper), and 1.0 wt.% or less Ni (nickel), where the Sb:Bi wt.% ratio is from 1:1.5-3.

Tulman is directed to and claims a lead-free solder composition consisting essentially of tin, antimony, bismuth and

silver, where the percentage weight proportions are: Tin--approximately 90-95%, Antimony--approximately 3-5%, Bismuth--approximately 1-4.5%, and Silver--approximately 0.1-0.5%.

More specifically, and as noted above, the Ag content in Tulman is below 0.5%. The purpose of addition Ag is to overcome the expected weakening of the alloy due to inclusion of bismuth. There is nothing in Tulman teaches the combined presence of Sb, Ni, and Bi in higher Ag content alloys.

And the cited experiment No. 1 of Tulman discloses a solder composition of Sn, Ag, Bi, and Sb, and Cu, Ni, Pb, As, Fe, Cd, and In. Due to the presence of the additional elements Pb, As and Fe in the cited experiment, Tulman cannot act as an anticipatory document against the inventive soldering material, as defined for instance in Claim 1.

The use of the transitional phrase "consisting essentially of" is open to elements that do not change the material characteristics of that which is claimed. These additional elements from Tulman are provided to indeed change the material characteristics.

Tulman does not disclose, teach or suggest a lead free soldering material that consists essentially of Sn (tin), 10 wt.% or less Ag (silver), Bi (bismuth), 1-3 wt.% Sb (antimony),

3 wt.% or less Cu (copper), and 1.0 wt.% or less Ni (nickel).
Moreover, one of ordinary skill in the art would not be motivated to prepare such a lead free soldering material based on or suggested by Tulman.

Achari is directed to and claims an electrical solder composition consisting essentially of: between 91.5-96.5% Sn; 2-5% Ag; 0-2% Cu; 0.1-2% Ni and having a melting temperature 220°C or less.

Archari does not disclose, teach or suggest a lead free solder alloy that contains 1-3 wt.% of Sb or one that has a Sb:Ni ratio of 1:1.5-3.

The Court of Appeals for the Federal Circuit has recently discussed the requirements of Section 102 anticipation.

"[u]nless a reference discloses within the four corners of the document not only all of the limitations claimed but also all of the limitations arranged or combined in the same way as recited in the claim, it cannot be said to prove prior invention of the thing claimed and, thus, cannot anticipate under 35 U.S.C. § 102." Net Moneyin, Inc. v. Verisign, Inc., 2007-1565 at 17-18 (Fed. Cir. October 20, 2008).

Thus, failing such precise disclosure as required for an effective anticipatory reference, rejections under Section 102 are improper. Here, neither Tulman nor Achari possesses

such disclosure. This Action has not established a proper Section 102 rejection based on Tulman or Achari. Accordingly, Applicants request reconsideration and withdrawal of the Section 102(b) rejection.

Section 103 Rejections

Claims 1-4, 6, 8-12, 16 and 18 stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Achari for the reasons given at pages 4-5 of the Action.

Claim 5 stands rejected under Section 103(a) as allegedly being unpatentable over Achari in view of International Patent Publication No. WO 00/48784 for the reasons given at pages 5-6 of the Action.

Applicants' cancellation of Claims 2, 4-6 and 10-12 renders moot the Section 103 rejections thereof. Applicants traverse the remaining Section 103 rejections.

Achari is directed to and claims an electrical solder composition consisting essentially of: between 91.5-96.5% Sn; 2-5% Ag; 0-2% Cu; 0.1-2% Ni and having a melting temperature 220°C or less.

At column 5, lines 52-58, Achari teaches that different alloys may be adapted for further improvements of mechanical and

physical properties by the inclusion of small quantities (less than 1% by weight) of other elements such as Bi, Sb, In, Ce and Zn.

The Examiner combines the general teaching of Achari with solder composition No. 1 of Table 1, which is made from Sn, Ag, Bi, and Sb. Such a combination is misleading, because Table 1 only summarizes lead-free solder compositions from the state of the art. Therefore solder composition No. 1 of Table 1 is not part of the inventive teaching of Achari.

Also, Achari refers in passing to the option to add Bi, Sb, In, Ce, Zn or Au at up to a total of 1 wt%. However, to reach the inventive lead free soldering material would require a very selective interpretation of Achari. To this end, it is notable that Achari defines his invention by the claims which do not include Sb and Bi.

Given Archari, one of ordinary skill in the art would not have been motivation to reach Applicants' invention as now defined. Moreover, one of ordinary skill in the art would not have had a reasonable expectation of success in reaching Applicants' invention as now defined.

There is nothing in Achari, whether individually or in combination with any one or more of the remaining documents of

record, that would lead person of ordinary skill in the art to a six component lead free soldering material having:

Sn (tin),
10 wt.% or less Ag (silver),
Bi (bismuth),
1-3 wt.% Sb (antimony),
3 wt.% or less Cu (copper), and
1.0 wt.% or less Ni (nickel),

Where the ratio of Sb:Ni is 1:1.5-3.

The only way that Achari could be used as reference for citation against the pending claims under Section 103 would be through the use of hindsight in the calculus of his examination. As is well settled hindsight cannot be used during the examination of an application for Letters patent of the United States.

Based on the above, reconsideration and withdrawal of the Section 103 rejections are respectfully requested.

Prompt and favorable consideration of the subject application are respectfully requested.

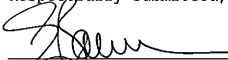
Accordingly, in view of these amendments and remarks, Applicants respectfully submit that all matters raised in the Action have been addressed and all rejections overcome.

Applicants further submit that the application is in condition for allowance, and respectfully request such an indication in the next written communication.

This paper represents an earnest attempt at advancing prosecution on the merits, and at the very least sharpens issues for appeal. Thus, entry hereof is deemed proper.

To the extent that the Examiner does not believe that the present paper places the application in condition for allowance, she is respectfully requested to contact Applicants' undersigned attorney by telephone at (860) 571-5001, by facsimile at (860) 571-5028 or by e-mail at steve.bauman@us.henkel.com. All correspondence should continue to be directed to the address given below.

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